



(11) **EP 1 659 037 B1**

(12) **EUROPEAN PATENT SPECIFICATION**

(45) Date of publication and mention
of the grant of the patent:
19.11.2008 Bulletin 2008/47

(51) Int Cl.:
B60R 21/34 ^(2006.01)

(21) Application number: **05077547.7**

(22) Date of filing: **07.11.2005**

(54) **Mechanism and method for lifting the hood or bonnet of a motor vehicle**

Vorrichtung und Verfahren zum Anheben der Fronthaube eines Fahrzeugs

Dispositif et procédé pour soulever le capot frontal d'un véhicule

(84) Designated Contracting States:
**AT BE BG CH CY CZ DE DK EE ES FI FR GB GR
HU IE IS IT LI LT LU LV MC NL PL PT RO SE SI
SK TR**

(30) Priority: **17.11.2004 US 628754 P**

(43) Date of publication of application:
24.05.2006 Bulletin 2006/21

(60) Divisional application:
07075295.1 / 1 820 703

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EP 1 659 037 B1

Description

TECHNICAL FIELD

[0001] This present invention relates generally to an apparatus for lifting a hood of a vehicle, more particularly the present invention is related to an apparatus for enabling the lifting of the hood in accordance with a predetermined activation event.

BACKGROUND OF THE INVENTION

[0002] Vehicles are typically provided with a front hood positioned at the forward end of the vehicle. The front hood is generally pivotally mounted to the vehicle frame by a pair of hinges disposed at the rearward end of the hood. The hinges allow the hood to pivot about the point of securement so that access may be provided to the engine compartment disposed below the hood. In a forward or head on collision the hood and front end of the vehicle will make first contact with the pedestrian. In the unfortunate event of a head on collision between a vehicle and a pedestrian, the pedestrian may impact upon a portion of the hood.

[0003] Accordingly, it is desirable to provide a method and apparatus for use with and in anticipation of a collision with of a pedestrian with a portion of the hood.

SUMMARY OF THE INVENTION

[0004] Disclosed herein is an apparatus for moving a portion of a vehicle hood away from a portion of the vehicle, the apparatus comprising at least one hinge for pivotally securing the hood to the vehicle, the hinge comprising: a base portion; a first member being either pivotally secured to the base portion or the hood at one end and releasably secured at its opposite end; a second member for moving the hood away from the vehicle when the first member has been released from either the hood or the base portion; and an activation device for providing a lifting force to the hood, wherein activation of the activation device releases the first member and provides a force for moving a portion of the hood away from the vehicle.

[0005] In one exemplary embodiment, a releasable hinge for securing a hood to a vehicle is provided. The releasable hinge comprising: a base portion; a first member pivotally secured to the base portion at one end and a pair of members at the other end, a first one of the pair of members being pivotally secured to the base portion and a second one of the pair of members being pivotally secured to the first member at one end and the other end of the second one of the pair of members is configured to be pivotally secured to the hood; and a release mechanism for releasably securing the first member and the pair of members to the base portion, wherein the first member and the first one of the pair of members are able to pivot from a first position to a second position with

respect to the base portion and the second one of the pair of members is able to pivot with respect to the first member and the first one of the pair of members after the release mechanism has been activated.

[0006] In another exemplary embodiment, an activation system for a hood of a vehicle is provided. The activation system comprising: the activation system comprising: a pair of releasable hinges for pivotally securing the hood to the vehicle, each hinge of the pair of releasable hinges comprising: a base portion; a first member pivotally secured to the base portion at one end and a pair of members at the other end, a first one of the pair of members being pivotally secured to the base portion and a second one of the pair of members being pivotally secured to the first member at one end and the other end of the second one of the pair of members is configured to be pivotally secured to the hood; and a release mechanism for releasably securing the first member and the pair of members to the base portion, wherein the first member and the first one of the pair of members are able to pivot from a first position to a second position with respect to the base portion and the second one of the pair of members is able to pivot with respect to the first member and the first one of the pair of members after the release mechanism has been activated; and a lift mechanism for providing a lifting force to the hood, wherein activation of the lift mechanism moves a portion of the hood away from the vehicle when the release mechanism has been activated.

[0007] The document US6345679 A discloses a releasable hinge according to the prior art. This releasable hinge for securing a hood to a vehicle comprises

a base portion;
a first member pivotally secured to the base portion at one end and connected to a pair of members at the other end by a further member a first one of the pair of members being pivotally secured to the base portion and a second one of the pair of members being pivotally secured to the further member at one end and the other end of the second one of the pair of members is configured to be pivotally secured to the hood; and
a release mechanism for releasably securing the first member and the pair of members to the base portion, wherein the first member and the first one of the pair of members are able to pivot from a first position to a second position with respect to the base portion and the second one of the pair of members is able to pivot with respect to the first member and the first one of the pair of members after the release mechanism has been activated.

[0008] The subject matter of claim 1 differs from the releasable hinge of US6345679 A in that the first member is pivotally and slidably connected to the pair of members.

[0009] The above-described and other features of the present disclosure will be appreciated and understood

by those skilled in the art from the following detailed description, drawings, and appended claims.

BRIEF DESCRIPTION OF THE DRAWINGS:

[0010]

Figure 1 is a view of a vehicle and a pedestrian illustrating the hood in a non-actuated position;
 Figure 2 is a view of a vehicle and a pedestrian illustrating the hood in an actuated position;
 Figure 3 is a perspective view of an exemplary embodiment of the present invention in a pre-activation position;
 Figure 4 is a perspective view of an exemplary embodiment of the present invention in a post activation position;
 Figure 5 is a top plan view of an exemplary embodiment of the present invention in a pre-activation position;
 Figures 6A-6D are perspective views of an exemplary embodiment of the present invention in a post activation position;
 Figures 7-9 illustrate various positions of an exemplary embodiment of the present invention;
 Figures 10A-10B are perspective cross sectional views of an exemplary embodiment of the present invention in a pre-activation position;
 Figure 11 is a perspective cross sectional view of an exemplary embodiment of the present invention in a post-activation position;
 Figure 12 is a perspective view of an actuating mechanism of an exemplary embodiment of the present invention in a pre-activation position;
 Figure 13 is a side view of an actuating mechanism of an exemplary embodiment of the present invention in a post-activation position;
 Figure 14 is a perspective view of an actuating mechanism of an exemplary embodiment of the present invention in a pre-activation position;
 Figure 15 is a view along lines 15-15 of Figure 14;
 Figure 16 is a perspective view of an actuating mechanism of an exemplary embodiment of the present invention in a post-activation position;
 Figure 17 is a view along lines 17-17 of Figure 16;
 Figures 18-20 are perspective views of an exemplary embodiment of the present invention;

DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0011] Disclosed herein is an apparatus for releasing and moving a portion of a hood of a vehicle. Referring now to Figure 1, a vehicle 10 is illustrated. Vehicle 10 has a hood 12, which is typically located at a forward portion of the vehicle. Also shown in Figure 1 is a pedestrian 14. Unfortunately and in the event of a collision between the vehicle and the pedestrian the pedestrian may impact the hood of the vehicle.

[0012] Figure 2 illustrates the vehicle with the hood repositioned by a hood lift mechanism 15 in accordance with an exemplary embodiment of the present invention. In accordance with an exemplary embodiment of the present invention hood lift mechanism 15 is coupled to a controller 11, which is in electrical communication with a sensor 17 that is configured and positioned to detect or predict an impact with the pedestrian. If an impending impact is detected, an activation signal is sent to the controller for activation of the hood lift mechanism or alternatively the signal from the sensor is sent directly to the hood lift mechanism, wherein the hood is lifted (Figure 2) prior to impact with the pedestrian.

[0013] In accordance with an exemplary embodiment, the sensor or sensor system of the vehicle may comprise an accelerometer or other equivalent device, in conjunction with a radar or distance sensing system in order to predict whether an impact is about to occur. In accordance with an exemplary embodiment controller 11 comprises a sensor or sensing-and-diagnostic module that is adapted to detect an activation event wherein the occurrence of a threshold event will cause an activation signal to be generated and received by the hood lift mechanism, thereby causing the rear portion of the hood to be lifted. The detection of the threshold event is determined by one or more sensors, which are disposed about the vehicle in accordance with known technologies. Some exemplary sensors may include impact sensors at the front as well as other locations of the vehicle as well as accelerometers to detect massive decelerations. Thus, the activation signal controls activation of the hood lift mechanism. In an exemplary embodiment, the sensing-and-diagnostic module comprises a microprocessor, microcontroller or other equivalent processing device capable of executing commands of computer readable data or program for executing a control algorithm that controls the operation of the hood lift mechanism. In order to perform the prescribed functions and desired processing, as well as the computations therefore (e.g., the execution of fourier analysis algorithm(s), the control processes prescribed herein, and the like), the controller may include, but not be limited to, a processor(s), computer(s), memory, storage, register(s), timing, interrupt(s), communication interfaces, and input/output signal interfaces, as well as combinations comprising at least one of the foregoing. For example, the controller may include input signal filtering to enable accurate sampling and conversion or acquisitions of such signals from communications interfaces. As described above, exemplary embodiments of the present invention can be implemented through computer-implemented processes and apparatuses for practicing those processes.

[0014] Accordingly, exemplary embodiments of the present invention provide an apparatus for providing a hood hinge having a disengagement/release function and the lift mechanism that raises the rear edge of the hood during the detection of a pre-determined activation event. This lifting of the rear edge of the hood will provide

additional clearance between hard object located under the hood and the hood itself. Thus, portions of the hood are capable of being deflected, deformed, caved in, etc. upon impact with a pedestrian as they are moved away from hard objects beneath the hood.

[0015] Referring now to Figures 3 and 4, a releasable hinge 16 for use with the hood lift mechanism of an exemplary embodiment of the present invention is illustrated. As illustrated, the releasable hinge comprises a base plate portion 18 having a first member 20 pivotally secured to the base portion at one end and a pair of members 22, 24 at the other end. In an exemplary embodiment base portion 18 is configured for securement to a portion of the vehicle. Alternatively, base portion 18 will comprise a portion of the vehicle frame. One of the pair of members 22 is pivotally secured to the base portion at an opposite end and the other one of the pair of members 24 is configured to be movably secured to the hood at its opposite end. In an exemplary embodiment member 20 is pivotally mounted to a flange portion 26 of base portion 18. In addition, and at the opposite end member 20 is configured to have an elongated opening 28, which as illustrated, facilitates the movement of the pair of members 22 and 24 with respect to member 20 when a release mechanism 30 of the device has been activated.

[0016] As illustrated in Figure 3, the releasable hinge is shown in a pre-activation position, wherein the hood will pivot about a pivot member 32 of member 24 during normal non-activated operation of the hood. In this configuration, member 24 is prevented from pivoting with respect to the base portion and member 22. In accordance with an exemplary embodiment, member 24 is only released from this configuration when release mechanism 30 has been activated.

[0017] Referring now to Figures 3-11, and in the event of a collision with a pedestrian wherein an activation signal is received by the release mechanism, the release mechanism will release member 24 from its non-pivotal securement to the base portion. In accordance with an exemplary embodiment of the present invention, release mechanism 30 is a pyrotechnically activated device secured to a flange portion 34 of base portion 18. In addition, member 22 is also pivotally secured to flange portion 34. It is, of course, understood that member 22 and mechanism 30 may be secured to other portions of base portion 18 or alternatively base portion 18 may comprise a portion of the vehicle's structural components.

[0018] As shown in Figures 10A-11 release mechanism 30 has a release bolt 36 slidably received within a passage 38 of mechanism 30. Release bolt 36 has an end portion 40 fixedly secured to member 24 by an activation indicator 42, wherein end portion 40 passes through an opening 44 in member 24, an opening 46 in member 22, and an opening 48 in flange portion 34. As will be discussed herein activation indicator 42 is releasably secured to end portion 40. Thus, in this configuration release bolt 36 will prevent members 20, 22 and 24 from pivoting with respect to the base plate until activation of

the release mechanism. Upon receipt of an activation signal from one of the vehicle sensors or the control module a pyrotechnic device or pyrotechnic squib 50 will fire providing an activation force to a central portion 52 of the release bolt. Central portion 52 is configured to facilitate movement of the release bolt in the direction of arrow 54. As release bolt 52 moves in the direction of arrow 54 end portion 40 slides out of openings 44, 46 and 48. This movement of release bolt 36 in passage 38 also causes activation indicator 42 to become dislodged from end portion 40 as activation indicator 42 has a flange portion 56 that is larger in size than opening 48. Activation indicator 42 further comprises a stud portion 58 that is releasably received with an opening 60 disposed in end portion 40. Stud portion 58 may be press fit into opening 60 in order to allow hinge 16 to be used as a conventional hood hinge. Alternatively, stud portion 58 may comprise a plurality of threads for engaging complimentary threads in opening 60, wherein the threads and stud portion 58 are formed from a plastic material that will give upon activation of pyrotechnic device 50. In addition to being releasably secured to release bolt 36, activation indicator will provide a means for determining whether device 50 has been activated. This is particularly useful in post accident investigations as after the collision the hinge mechanism may be in a different configuration than at the time of impact.

[0019] At its opposite end release bolt 52 has a forward portion 62 configured to have a portion received within an opening 64 of release mechanism 30 when the release bolt slides in the direction of arrow 54. This portion in one embodiment will provide a means for determining whether the device has been activated as well as providing a means for retaining the release bolt in the deployed position (Figure 11). As illustrated in Figures 10A-11, pyrotechnic device 50 is received with an opening 66 that is in fluid communication with passage 38 so that the combustion forces of squib 50 are able act upon central portion 52 (e.g., pyrotechnic device 50 ignites and increases the pressure within passage 38 thus creating a force upon release bolt 52). In addition, and as illustrated central portion 52 is angularly configured or chamfered to assist in movement of the release bolt by squib 50 and forward end 62 is also configured to have a shoulder portion configured to engage a shoulder portion of passage 38. It is, of course, understood that the configuration of bolt 36 and passage 38 may vary from those illustrated in the Figures and the same are merely provided as non-limiting examples of one exemplary embodiment.

[0020] Referring now to Figures 12-17, a lift mechanism 70 for use with releasable hinge 16 is illustrated. As previously discussed, releasable hinge provides a means for releasing the hood from the vehicle structure so that the same can be displaced away from the vehicle prior to impact with a pedestrian. Accordingly, lift mechanism 70 provides the means to relocate or move a portion of the hood after the releasable hinge has been activated. The lift mechanism is configured to provide a

lifting force to the hood when the release mechanism has been activated. In an exemplary embodiment, lift mechanism 70 comprises a plurality of telescoping members 72, which allow the vertical dimension of lift mechanism 70 to increase from an unexpanded height of "X" to an expanded height "Y". In accordance with an exemplary embodiment, an actuation device 74 is disposed within members 72. Actuation device 74 provides a force for expanding members 72 to the configuration illustrated in Figures 13, 16 and 17. In accordance with an exemplary embodiment, actuating device may be a compressed spring or a device or vessel holding a compressed gas wherein upon release of the spring or the compressed gas will apply a force to one of the members in order to expand them into the configuration of Figures 13, 16 and 17. Alternatively, device 74 is a pyrotechnic device capable of providing such an actuating force. Other equivalent devices are also contemplated for providing the means for providing a force to members 72. In accordance with an exemplary embodiment an activation signal is provided to mechanism 70 from either the controller or directly from a sensor disposed on the vehicle, whereupon receipt of this signal will cause activation of device 74 to provide the necessary force to expand members 72 and move hood 12. In yet another alternative exemplary embodiment, a single device 71 (e.g., pyrotechnical, compressed gas, mechanical (compressed spring)) is configured to provide the necessary force to expand members 72 as well as slide release bolt in the direction of arrow 54. In this embodiment, the single device will receive an activation signal from a sensor disposed on the forward end of the vehicle, which determines if an impact with a pedestrian has or is about to occur. In this embodiment, the single device may be located within releasable hinge 16 or lift mechanism 70 or proximate to both, and in the case of pyrotechnically activated devices or compressed gas devices a single conduit 73 provides fluid communication between the chambers of lift mechanism 70 and releasable hinge 16 in order to release the hinge and lift the portion of the hood from the vehicle via a single device. A non-limiting example of such a conduit is illustrated by the dashed lines in Figure 19. In yet another alternative exemplary embodiment, and in the case of mechanical devices for manipulation of lift mechanism 70 and releasable hinge 16 a pair of compressed springs may be located in lift mechanism 70 and releasable hinge 16 wherein a single cable travels through conduit 73 for manipulation of the mechanical devices in order to allow the compressed springs to expand lift mechanism 70 and slide the release bolt within passage 38.

[0021] In accordance with an exemplary embodiment, lift mechanism 70 and release hinge 16 are used together to provide the desired movement of the hood when sensors in the vehicle have detected a predetermined activation event. As illustrated in Figures 18-19, lift mechanism is positioned proximate to release hinge 16. Accordingly, and upon receipt of an activation signal from a sensor or a control module linked to a sensor, devices 50

and 74 are activated or a single device 71 is activated wherein lift mechanism expands to make contact with a portion of the hood proximate to the release hinge and release hinge 16 is released so that it can expand to the configurations illustrated in Figures 4, 6A, 6B and 6C thereby allowing the rearward portion of the hood to be displaced from the vehicle (Figure 2) in order to provide an unoccupied area between the bottom of the hood and objects in the engine compartment so that portions of the hood will be able to deform or cave in upon impact with a pedestrian.

[0022] In accordance with an exemplary embodiment, the releasable hinge could potentially be resettable, wherein after activation, the hood is reconnectable to its normal operation. This reconnection could occur at an authorized dealership of mechanic.

[0023] In accordance with an exemplary embodiment, a pair of releasable hinges are provided and at least one lifting mechanism is provided to displace the hood away from the vehicle.

[0024] In addition, the releasable hinges of exemplary embodiments of the present invention may comprise a portion of the energy absorption system of the hood. In this embodiment and upon impact, the hinges and/or the lift mechanism are capable of moving downwardly upon impact with an object on the hood. In fact, the lift mechanism or releasable hinge is capable of being provided with a resistance force that needs to be overcome in order for the lift mechanism or hood to be displaced back towards the vehicle. Thus, the release mechanism after being deployed may provide a ride down effect after impact with the pedestrian.

[0025] The upward motion of rearward edge of the hood may be controlled if contact occurs prior to full deployment. It should be noted that the requirements (timing and clearance) may be adaptable depending on the vehicle geometry, impact speed, size of the occupant, etc detected by the sensor. An example of a sensing control system is found in U.S. Patent Number 6,520,276, the contents of which are incorporated herein by reference thereto.

[0026] Accordingly, exemplary embodiments of the present invention are intended to provide a means for elevating a portion of the hood prior to contact. In exemplary embodiments of the present invention, the hood is elevated through a pyrotechnically activated hinge release mechanism and lift actuator which will allow the hood to deform and absorb impact energy before bottoming out on under hood hard objects such as engine etc.

[0027] Operation of exemplary embodiments of the present invention are contemplated as follows, during normal (no-crash) operations, the hood is in its normal position. The releasable hinges remain engaged with the vehicle structure through the use of a pin/bolt. At occupant contact with the front bumper, a signal is transmitted by the detection sensor to the controller which then activates a pyrotechnic device. This device is then used to

push the pin/bolt out which will disengage the hood along with the hinges from the vehicle structure connection and results in releasing of the hinge. Once the hinges are released, the hood is lifted upwards at the rear edge through a lift mechanism or a lift mechanism that comprises a portion of the releasable hinge. The motion is assisted through a telescoping spring release system and/or compressed gas or a pyrotechnic lift mechanism. It should be noted that the upward motion can be stopped/reduced once resistance is encountered due to occupant contact.

[0028] In addition, and as an alternative exemplary embodiment, an airbag can be used under the hood or can be deployed between the hood inner and outer surfaces.

Claims

1. A releasable hinge (16) for securing a hood (12) to a vehicle (10), the releasable hinge comprising:

a base portion (18);

a first member (20) pivotally secured to the base portion at one end and pivotally and slidably secured to a pair of members (22, 24) at the other end, a first one of the pair of members being pivotally secured to the base portion and a second one of the pair of members being pivotally secured to the first member at one end and the other end of the second one of the pair of members is configured to be pivotally secured to the hood; and

a release mechanism (30) for releasably securing the first member and the pair of members to the base portion, wherein the first member and the first one of the pair of members are able to pivot from a first position to a second position with respect to the base portion and the second one of the pair of members is able to pivot with respect to the first member and the first one of the pair of members after the release mechanism has been activated.

2. The releasable hinge as in claim 1, wherein the first member and the pair of members are substantially parallel to each other in the first position.
3. The releasable hinge as in claim 1, wherein the release mechanism further comprises a release bolt (36) configured to be manipulated from a locking position to an unlocking position wherein the release bolt prevents the first member and the first one of the pair of members from pivoting to the second position when the release bolt is in the locking position.
4. The releasable hinge as in claim 3, wherein a portion of the release bolt is located in an opening (44, 46) in the pair of members when the first member and

the pair of members are in the first position and the release bolt is in the locking position.

5. The releasable hinge as in claim 4, wherein the release mechanism further comprises a pyrotechnically activated device (50) for providing an activation force to the release bolt in order move the release bolt from the locking position to the unlocking position.
6. The releasable hinge as in claim 5, wherein the release mechanism further comprises an activation indicator (42) that becomes dislodged from the releasable hinge upon activation of the release mechanism.
7. The releasable hinge as in claim 1, wherein the pair of members are pivotally secured to each other through an elongated opening (28) of the first member.
8. The releasable hinge as in claim 7, wherein the first member and the pair of members are substantially parallel to each other in the first position and the release mechanism further comprises a release bolt (36) configured to be manipulated from a locking position to an unlocking position wherein the release bolt prevents the first member and the first one of the pair of members from pivoting to the second position when the release bolt is in the locking position and wherein a portion of the release bolt is located in an opening (44, 46) in the pair of members when the first member and the pair of members are in the first position and the release bolt is in the locking position.
9. The releasable hinge as in claim 8, wherein the release mechanism further comprises a pyrotechnically activated device (50) for providing an activation force to the release bolt in order move the release bolt from the locking position to the unlocking position and wherein the release mechanism further comprises an activation indicator (42) that becomes dislodged from the releasable hinge upon activation of the release mechanism.
10. The releasable hinge as in claim 9, wherein the base portion further comprises a flange portion (34) and the release mechanism and the first one of the pair of members are secured to the flange portion.
11. The releasable hinge as in claim 1, wherein the base portion is integrally formed with a portion of the vehicle and the second one of the pair of members is configured to have a pivot pin (32).
12. An activation system (15) for a hood (12) of a vehicle (10), the activation system comprising:

a pair of releasable hinges (16) for pivotally securing the hood to the vehicle, each hinge of the pair of releasable hinges comprising:

a base portion (18);
 a first member (20) pivotally secured to the base portion at one end and pivotally and slidably secured to a pair of members (22, 24) at the other end, a first one of the pair of members being pivotally secured to the base portion and a second one of the pair of members being pivotally secured to the first member at one end and the other end of the second one of the pair of members is configured to be pivotally secured to the hood; and
 a release mechanism (30) for releasably securing the first member and the pair of members to the base portion, wherein the first member and the first one of the pair of members are able to pivot from a first position to a second position with respect to the base portion and the second one of the pair of members is able to pivot with respect to the first member and the first one of the pair of members after the release mechanism has been activated; and
 a lift mechanism (70) for providing a lifting force to the hood, wherein activation of the lift mechanism moves a portion of the hood away from the vehicle when the release mechanism has been activated.

13. The activation system as in claim 12, wherein the lift mechanism comprises a plurality of telescoping members (72).

14. The activation system as in claim 13, wherein the release mechanism further comprises a release bolt (36) configured to be manipulated from a locking position to an unlocking position wherein the release bolt prevents the first member and the first one of the pair of members from pivoting to the second position when the release bolt is in the locking position and wherein a portion of the release bolt is located in an opening (44, 46) in the pair of members when the first member and the pair of members are in the first position and the release bolt is in the locking position, wherein the release mechanism further comprises a pyrotechnically activated device (50) for providing an activation force to the release bolt in order move the release bolt from the locking position to the unlocking position.

15. The activation system as in claim 14, wherein the pyrotechnically activated device also provides an activation force to the plurality of telescoping members of the lift mechanism.

16. The activation system as in claim 14, wherein the release mechanism further comprises an activation indicator that becomes dislodged from the releasable hinge upon activation of the release mechanism.

Patentansprüche

1. Öffnungsfähiges Scharnier (16) zur Befestigung einer Fronthaube (12) an einem Fahrzeug (10), wobei das öffnungsfähige Scharnier umfasst:

Socketteil (18);
 an einem Ende schwenkbar und am anderen Ende gleitfähig an einem Bauteilepaar (22, 24) angebrachtes erstes Bauteil (20), wobei ein erstes schwenkbar an dem Socketteil angebrachtes Bauteilepaar und ein zweites schwenkbar an einem Endes des ersten Bauteil angebrachtes Bauteilepaar zur schwenkbaren Anbringung an der Fronthaube konfiguriert sind; sowie
 Öffnungsmechanismus (30) zur öffnungsfähigen Anbringung des ersten Bauteils und des Bauteilepaars am Sockelteil, wobei das erste Bauteil und das erste Bauteilepaar von einer ersten Stellung relativ zum Socketteil in eine zweite Stellung geschwenkt werden können, und das zweite Bauteilepaar relativ zum ersten Bauteil und dem ersten Bauteilepaar geschwenkt werden kann, wenn der Öffnungsmechanismus ausgelöst wurde.

2. Öffnungsfähiges Scharnier (16) nach Anspruch 1, wobei das erste Bauteil und das Bauteilepaar in der ersten Stellung im Wesentlichen parallel zueinander sind.

3. Öffnungsfähiges Scharnier (16) nach Anspruch 1, wobei der Öffnungsmechanismus des Weiteren einen Öffnungsbolzen (36) aufweist, welcher dazu konfiguriert ist, von einer Sperrstellung in eine Entsperrstellung gebracht zu werden, wobei der Öffnungsbolzen das erste Bauteil und das erste Bauteilepaar daran hindert, sich in die zweite Stellung zu bewegen, wenn der Öffnungsbolzen in der Sperrstellung ist.

4. Öffnungsfähiges Scharnier (16) nach Anspruch 3, wobei ein Teil des Öffnungsbolzens in einer Öffnung (44, 46) in dem Bauteilepaar untergebracht ist, wenn das erste Bauteil und das Bauteilepaar in der ersten Stellung sind und der Öffnungsbolzen in der Sperrstellung ist.

5. Öffnungsfähiges Scharnier (16) nach Anspruch 4, wobei der Öffnungsmechanismus des Weiteren eine pyrotechnisch ausgelöste Vorrichtung (50) zur Bereitstellung der Auslösekraft zum Bewegen des Öff-

nungsbolzens aus der Speerstellung in die Entsperrstellung umfasst.

6. Öffnungsfähiges Scharnier (16) nach Anspruch 5, wobei der Öffnungsmechanismus des Weiteren einen Auslöseanzeiger (42) umfasst, der nach der Auslösung des Öffnungsmechanismus aus dem öffnungsfähigen Scharnier freigegeben wird. 5
7. Öffnungsfähiges Scharnier (16) nach Anspruch 1, wobei das Bauteilepaar durch eine längliche Öffnung (28) im ersten Bauteil an diesem schwenkbar angebracht ist. 10
8. Öffnungsfähiges Scharnier (16) nach Anspruch 7, wobei das erste Bauteil und das Bauteilepaar in der ersten Stellung im Wesentlichen parallel zueinander sind, und der Öffnungsmechanismus des Weiteren einen Öffnungsbolzen (36) aufweist, welcher dazu konfiguriert ist, von einer Sperrstellung in eine Entsperrstellung gebracht zu werden, wobei der Öffnungsbolzen das erste Bauteil und das erste Bauteilepaar daran hindert, sich in die zweite Stellung zu bewegen, wenn der Öffnungsbolzen in der Sperrstellung ist, und wobei ein Teil des Öffnungsbolzens in einer Öffnung (44,46) in dem Bauteilepaar untergebracht ist, wenn das erste Bauteil und das Bauteilepaar in der ersten Stellung sind und der Öffnungsbolzen in der Sperrstellung ist. 15
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9. Öffnungsfähiges Scharnier (16) nach Anspruch 8, wobei der Öffnungsmechanismus des Weiteren eine pyrotechnisch ausgelöste Vorrichtung (50) zur Bereitstellung der Auslösekraft zur Bewegung des Öffnungsbolzens aus der Speerstellung in die Entsperrstellung umfasst, und wobei der Öffnungsmechanismus des Weiteren einen Auslöseanzeiger (42) umfasst, der nach dem Auslösen des Öffnungsmechanismus aus dem öffnungsfähigen Scharnier freigegeben wird. 30
35
40
10. Öffnungsfähiges Scharnier (16) nach Anspruch 9, wobei der Sockelteil des Weiteren einen Flanschteil (34) umfasst, und der Öffnungsmechanismus und das erste Bauteilepaar an diesem Flanschteil befestigt sind. 45
11. Öffnungsfähiges Scharnier (16) nach Anspruch 1, wobei der Sockelteil mit einem Teil des Fahrzeugs integriert gebildet wird, und das zweite Bauteilepaar einen Zapfen (32) aufweist. 50
12. Auslösesystem (15) für die Fronthaube (12) eines Fahrzeugs (10), welches umfasst: 55

Ein Paar öffnungsfähige Scharniere (16) zur schwenkbaren Anbringung der Fronthaube am Fahrzeug, wobei jedes Scharnier des öffnungs-

fähigen Scharnierpaares umfasst:

- Sockelteil (18); an einem Ende schwenkbar und am anderen Ende gleitfähig an einem Bauteilepaar (22, 24) angebrachtes erstes Bauteil (20), wobei ein erstes schwenkbar an dem Sockelteil angebrachtes Bauteilepaar und ein zweites schwenkbar an einem Endes des ersten Bauteil angebrachtes Bauteilepaar zur schwenkbaren Anbringung an der Fronthaube konfiguriert sind; sowie Öffnungsmechanismus (30) zur öffnungsfähigen Anbringung des ersten Bauteils und des Bauteilepaars am Sockelteil, wobei das erste Bauteil und das erste Bauteilepaar von einer ersten Stellung relativ zum Sockelteil in eine zweite Stellung geschwenkt werden können, und das zweite Bauteilepaar relativ zum ersten Bauteil und dem ersten Bauteilepaar geschwenkt werden kann, wenn der Öffnungsmechanismus ausgelöst wurde; sowie Hebevorrichtung (70) zur Bereitstellung von Hebekraft für die Fronthaube, wobei ein Auslösen der Hebevorrichtung einen Teil der Fronthaube vom Fahrzeug wegbewegt, wenn der Öffnungsmechanismus ausgelöst wurde.
13. Auslösesystem nach Anspruch 12, wobei die Hebevorrichtung mehrere teleskopische Bauteile (72) umfasst.
 14. Auslösesystem nach Anspruch 13, des Weiteren einen Öffnungsbolzen (36) aufweist, welcher dazu konfiguriert ist, von einer Sperrstellung in eine Entsperrstellung gebracht zu werden, wobei der Öffnungsbolzen das erste Bauteil und das erste Bauteilepaar daran hindert, sich in die zweite Stellung zu bewegen, wenn der Öffnungsbolzen in der Sperrstellung ist, und wobei ein Teil des Öffnungsbolzens in einer Öffnung (44,46) in dem Bauteilepaar untergebracht ist, wenn das erste Bauteil und das Bauteilepaar in der ersten Stellung sind und der Öffnungsbolzen in der Sperrstellung ist, wobei der Öffnungsmechanismus des Weiteren eine pyrotechnisch ausgelöste Vorrichtung (50) zur Bereitstellung der Auslösekraft zum Bewegen des Öffnungsbolzens aus der Speerstellung in die Entsperrstellung.
 15. Auslösesystem nach Anspruch 14, wobei die pyrotechnisch ausgelöste Vorrichtung außerdem die Auslösekraft für die mehreren teleskopischen Bauteile der Hebevorrichtung bereitstellt.
 16. Auslösesystem nach Anspruch 14, wobei der Öffnungsmechanismus des Weiteren einen Auslösean-

zeiger (42) umfasst, der nach der Auslösung des Öffnungsmechanismus aus dem offenen Scharnier freigegeben wird.

Revendications

1. Charnière libérable (16) pour fixer un capot (12) sur un véhicule (10), la charnière libérable comprenant :

une portion de base (18) ;
un premier élément (20) attaché en pivotement sur la portion de base à une extrémité et attaché en pivotement et en coulissement sur une paire d'éléments (22, 24) à l'autre extrémité, un premier élément de la paire d'éléments étant attaché en pivotement sur la portion de base, et un second élément de la paire d'éléments étant attaché en pivotement sur le premier élément à une extrémité, et l'autre extrémité du second élément de la paire d'éléments étant configurée pour être attachée en pivotement au capot ; et un mécanisme de libération (30) pour attacher de manière libérable le premier élément et la paire d'éléments sur la portion de base, dans lequel le premier élément et le premier élément de la paire d'éléments sont capables de pivoter depuis une première position vers une seconde position par rapport à la portion de base, et le second élément de la paire d'éléments est capable de pivoter par rapport au premier élément et au premier élément de la paire d'éléments après avoir activé le mécanisme de libération.

2. Charnière libérable selon la revendication 1, dans laquelle le premier élément et la paire d'éléments sont sensiblement parallèles les uns aux autres dans la première position.

3. Charnière libérable selon la revendication 1, dans laquelle le mécanisme de libération comprend en outre un goujon de libération (36) configuré pour être manipulé depuis une position de verrouillage vers une position de déverrouillage, telles que le goujon de libération empêche le premier élément et le premier élément de la paire d'éléments de pivoter vers la seconde position quand le goujon de libération est dans la position de verrouillage.

4. Charnière libérable selon la revendication 3, dans laquelle une portion du goujon de libération est située dans une ouverture (44, 46) dans la paire d'éléments quand le premier élément et la paire d'éléments sont dans la première position et que le goujon de libération est dans la position de verrouillage.

5. Charnière libérable selon la revendication 4, dans laquelle le mécanisme de libération comprend en

outre un dispositif (50) activé par voie pyrotechnique pour fournir une force d'activation au goujon de libération afin de déplacer le goujon de libération depuis la position de verrouillage vers la position de déverrouillage.

6. Charnière libérable selon la revendication 5, dans laquelle le mécanisme de libération comprend en outre un indicateur d'activation (42) qui est délogé de la charnière libérable lors de l'activation du mécanisme de libération.

7. Charnière libérable selon la revendication 1, dans laquelle la paire d'éléments sont attachés en pivotement l'un à l'autre à travers une ouverture allongée (28) du premier élément.

8. Charnière libérable selon la revendication 7, dans laquelle le premier élément et la paire d'éléments sont sensiblement parallèles les uns aux autres dans la première position, et le mécanisme de libération comprend en outre un goujon de libération (36) configuré pour être manipulé depuis une position de verrouillage vers une position de déverrouillage telles que le goujon de libération empêche le premier élément et le premier élément de la paire d'éléments de pivoter à la seconde position quand le goujon de libération est dans la position de verrouillage, et dans laquelle une portion du goujon de libération est située dans une ouverture (44, 46) de la paire d'éléments quand le premier élément et la paire d'éléments sont dans la première position et que le goujon de libération est dans la position de verrouillage.

9. Charnière libérable selon la revendication 8, dans laquelle le mécanisme de libération comprend en outre un dispositif (50) activé par voie pyrotechnique pour fournir une force d'activation au goujon de libération afin de déplacer le goujon de libération depuis la position de verrouillage vers la position de déverrouillage, et dans laquelle le mécanisme de libération comprend en outre un indicateur d'activation (42) qui est délogé de la charnière libérable lors de l'activation du mécanisme de libération.

10. Charnière libérable selon la revendication 9, dans laquelle la portion de base comprend en outre une portion de bride (34), et le mécanisme de libération et le premier élément de la paire d'éléments sont fixés sur la portion de bride.

11. Charnière libérable selon la revendication 1, dans laquelle la portion de base est formée de manière intégrale avec une portion du véhicule, et le second élément de la paire d'éléments est configuré de manière à présenter une tige de pivot (32).

12. Système d'activation (15) pour un capot (12) d'un

véhicule (10), le système d'activation comprenant :

une paire de charnières libérables (16) pour fixer en pivotement le capot sur le véhicule, chaque charnière de la paire de charnières libérables comprenant :

une portion de base (18) ;
un premier élément (20) attaché en pivotement à la portion de base à une extrémité et attaché en pivotement et en coulissement à une paire d'éléments (22, 24) à l'autre extrémité, un premier élément de la paire d'éléments étant attaché en pivotement à la portion de base et un second élément de la paire d'éléments étant attaché en pivotement au premier élément à une extrémité, et l'autre extrémité du second élément de la paire d'éléments étant configurée pour être attachée en pivotement au capot ; et
un mécanisme de libération (30) pour attacher de façon libérable le premier élément et la paire d'éléments sur la portion de base, dans lequel le premier élément et le premier élément de la paire d'éléments sont capables de pivoter depuis une première position vers une seconde position par rapport à la portion de base, et le second élément de la paire d'éléments est capable de pivoter par rapport au premier élément et au premier élément de la paire d'éléments après avoir activé le mécanisme de libération ; et
un mécanisme de soulèvement (70) pour appliquer une force de soulèvement au capot, dans lequel l'activation du mécanisme de soulèvement déplace une portion du capot en éloignement du véhicule quand le mécanisme de libération a été activé.

13. Système d'activation selon la revendication 12, dans lequel le mécanisme de soulèvement comprend une pluralité d'éléments télescopiques (72).

14. Système d'activation selon la revendication 13, dans lequel le mécanisme de libération comprend en outre un goujon de libération (36) configuré pour être manipulé depuis une position de verrouillage vers une position de déverrouillage telles que le goujon de libération empêche le premier élément et le premier élément de la paire d'éléments de pivoter à la seconde position quand le goujon de libération est dans la position de verrouillage, et une portion du goujon de libération est située dans une ouverture (44, 46) dans la paire d'éléments quand le premier élément et la paire d'éléments sont dans la première position et que le goujon de libération est dans la position de verrouillage, dans lequel le mécanisme de libération comprend en outre un dispositif (50) activé par voie

pyrotechnique pour fournir une force d'activation sur le goujon de libération afin de déplacer le goujon de libération depuis la position de verrouillage vers la position de déverrouillage.

15. Système d'activation selon la revendication 14, dans lequel le dispositif activé par voie pyrotechnique fournit aussi une force d'activation à la pluralité d'éléments télescopiques du mécanisme de soulèvement.

16. Système d'activation selon la revendication 14, dans lequel le mécanisme de libération comprend en outre un indicateur d'activation qui est délogé de la charnière libérable lors de l'activation du mécanisme de libération.

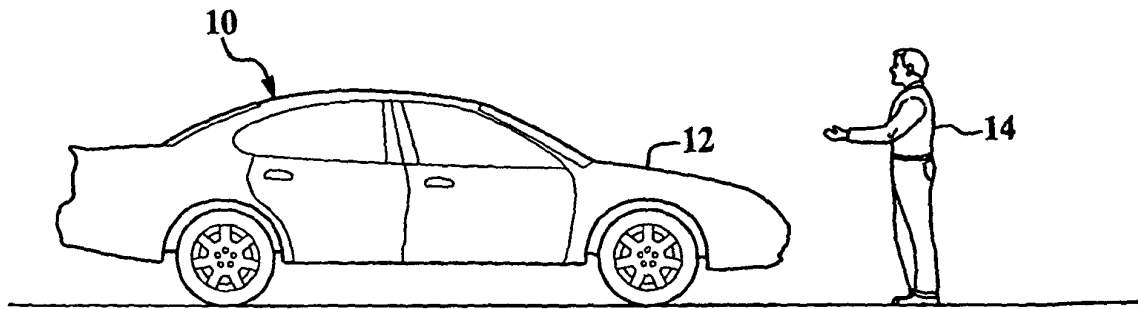


Fig.1.

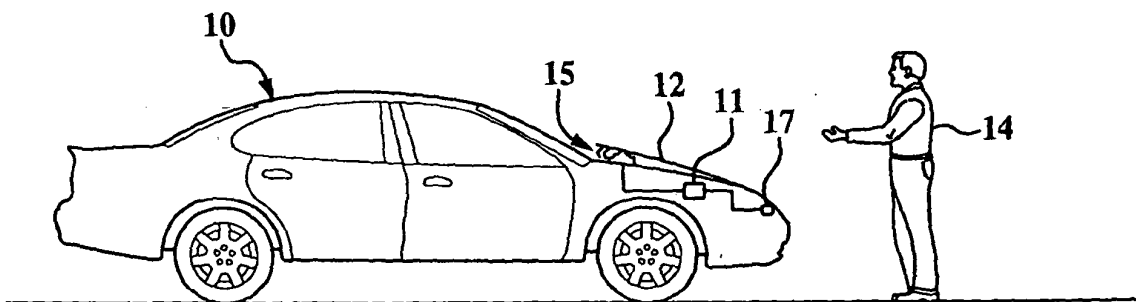


Fig.2.

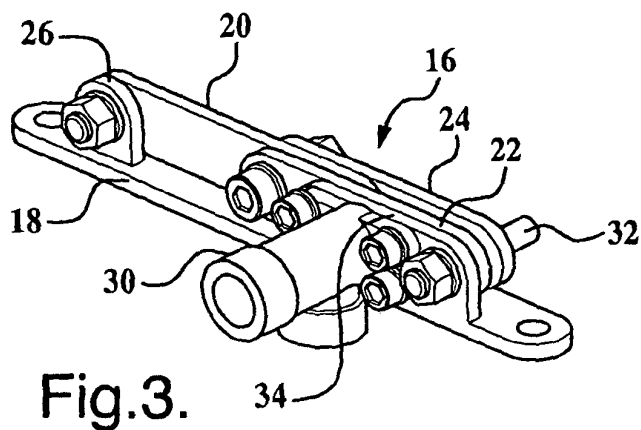


Fig.3.

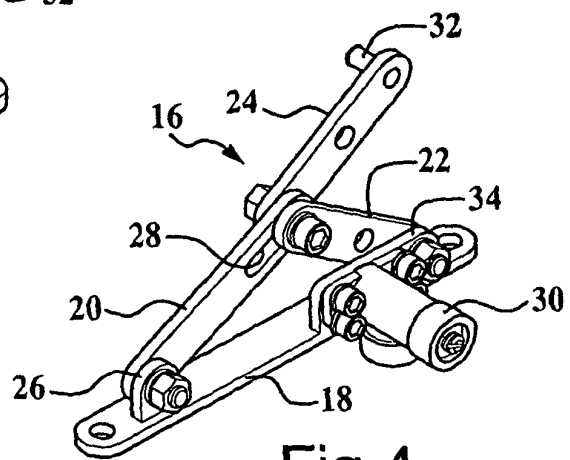


Fig.4.

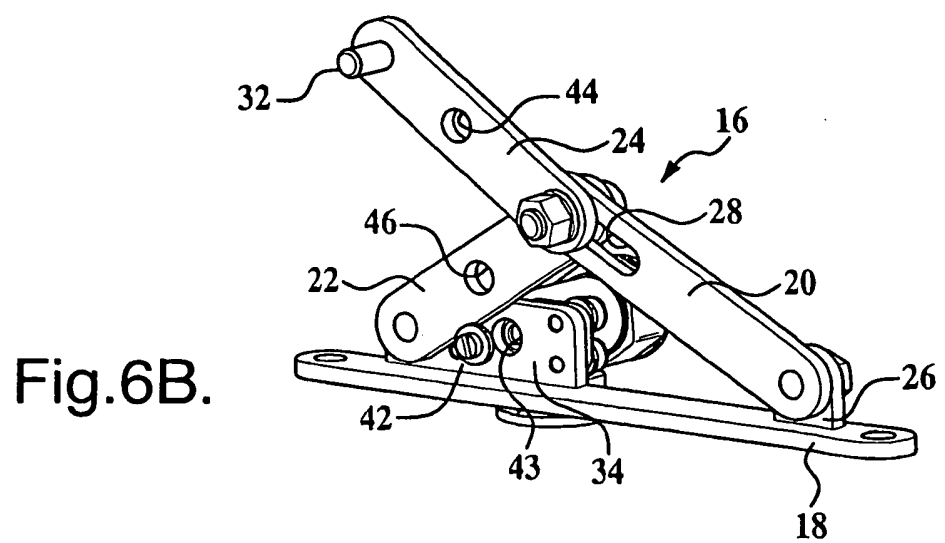
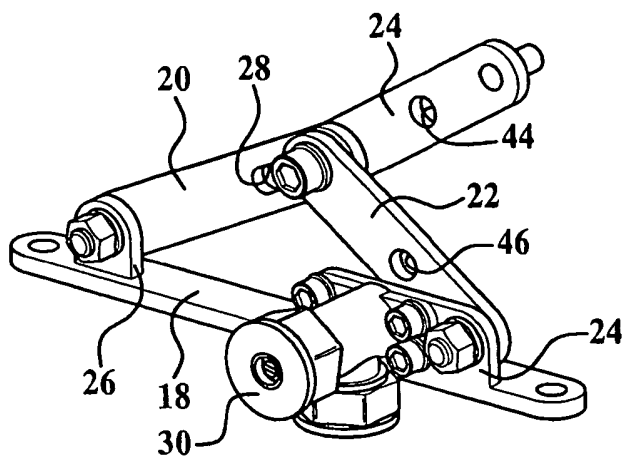
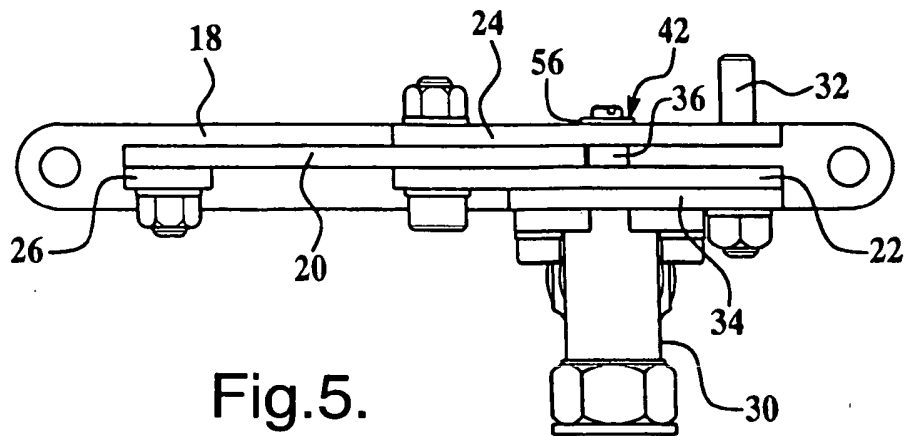


Fig.6C.

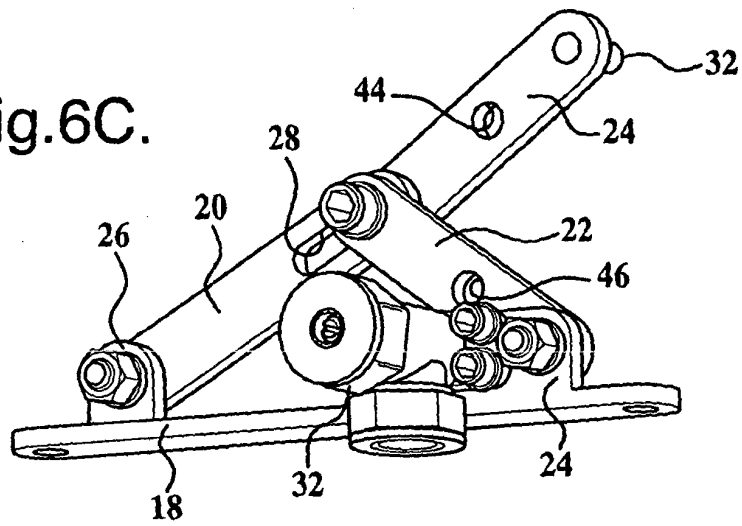


Fig.6D.

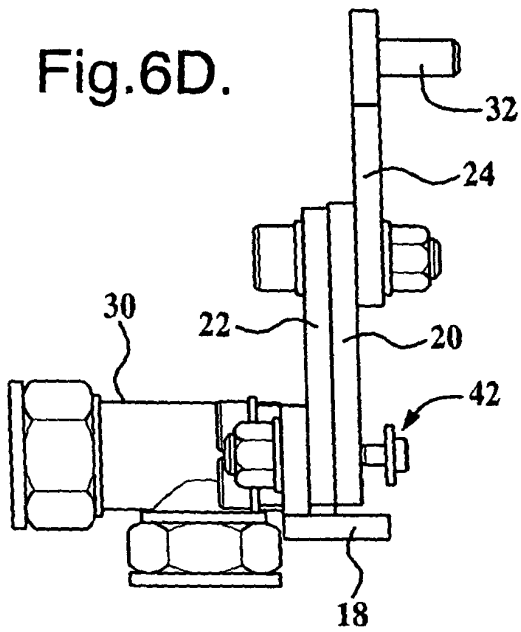
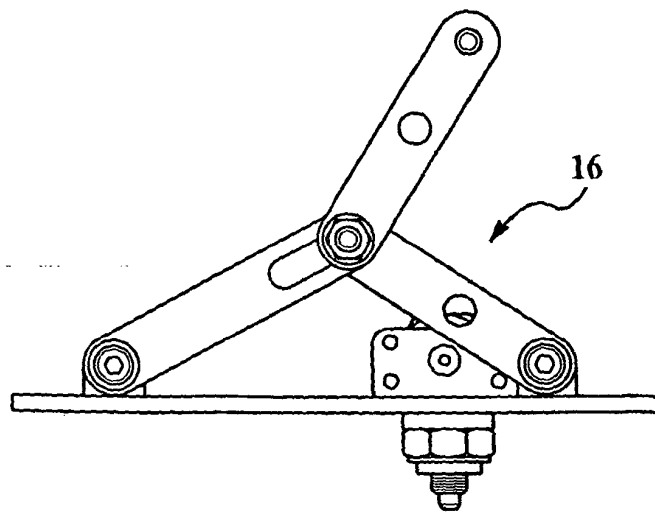
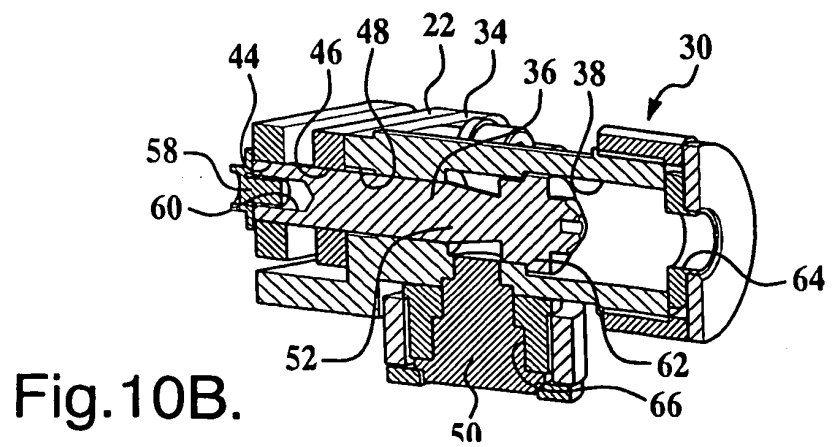
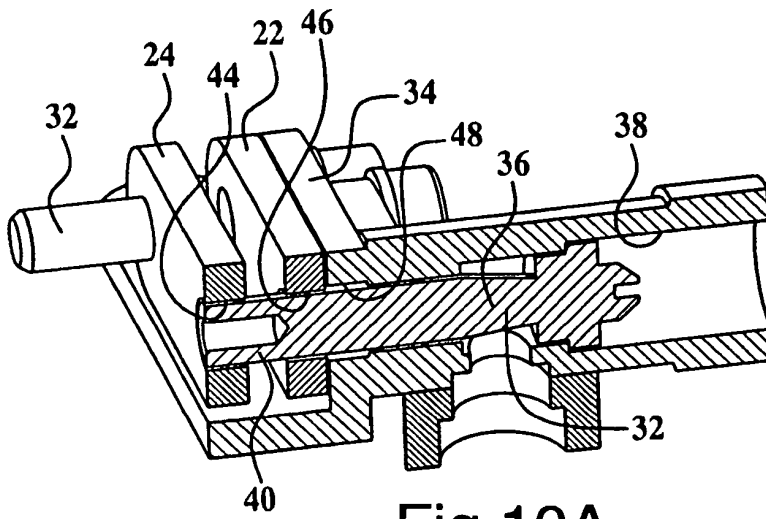
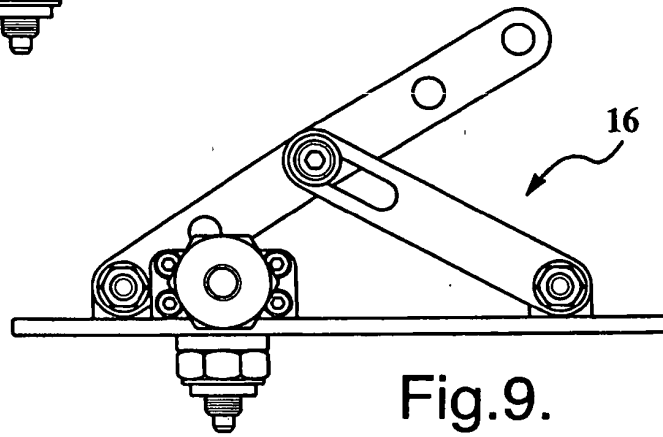
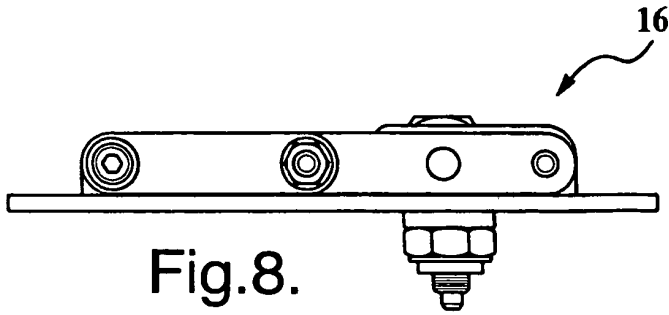


Fig.7.





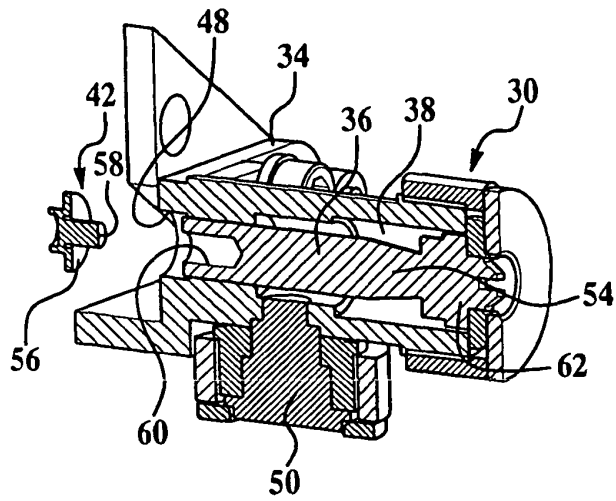


Fig.11.

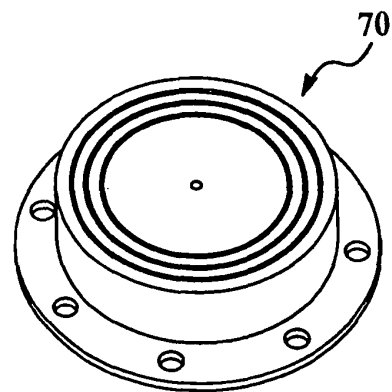


Fig.12.

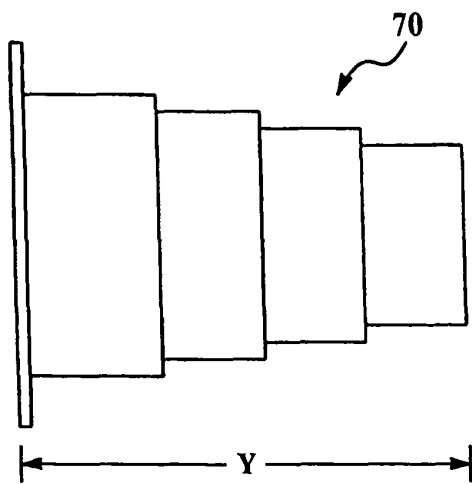


Fig.13.

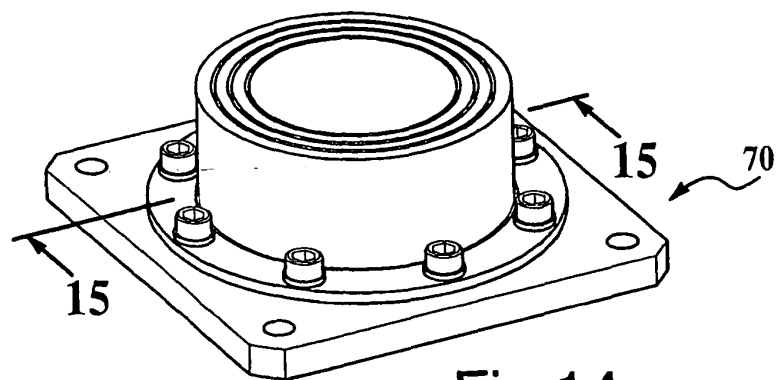


Fig.14.

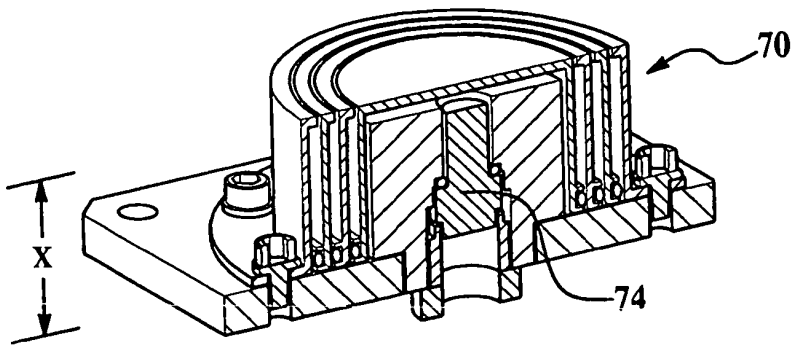


Fig.15.

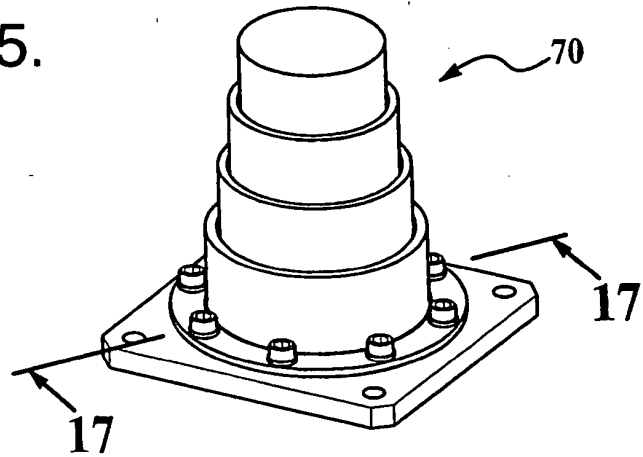


Fig.16.

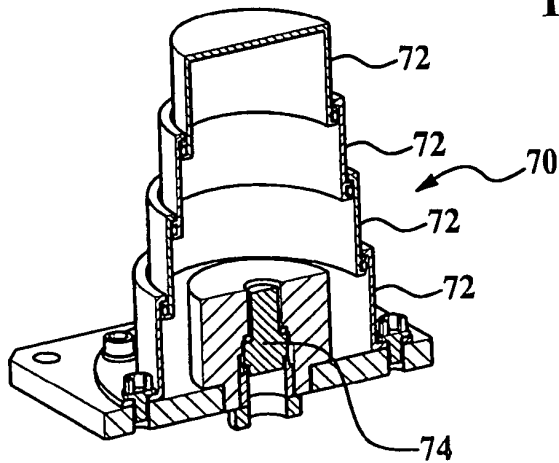


Fig.17.

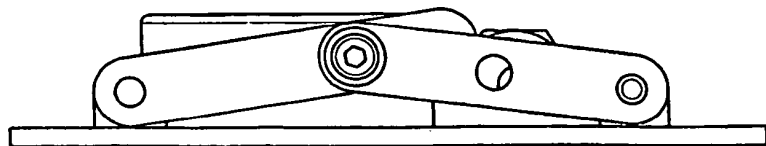


Fig.18.

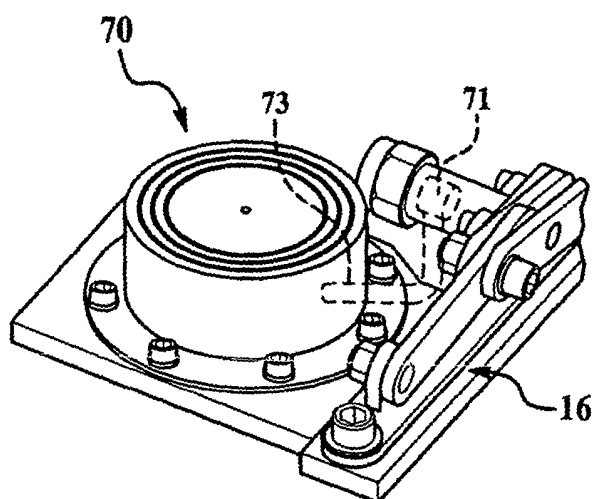


Fig.19.

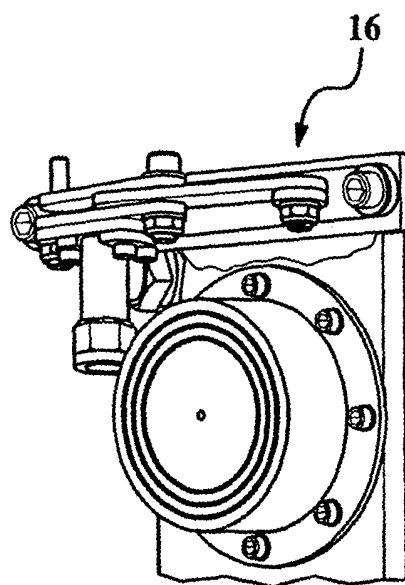


Fig.20.

REFERENCES CITED IN THE DESCRIPTION

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